CLAIMS

1. A method of producing a gas sensor having a sensor element extending in an axial direction and having a front end side to face a measured gas, a metallic housing radially surrounding the sensor element and holding the sensor element, a tubular metallic member provided to a rear end side of the metallic housing, at least one lead wire extending from an inside to an outside of the tubular metallic member and having a conductor wire electrically connected to the sensor element and an insulating film covering the conductor wire, and an elastic seal member having a lead wire insertion hole into which the lead wire is inserted, characterized by comprising:

a disposition step of preparing the elastic seal member having a main body portion and a smaller diameter portion smaller in outer diameter than the main body portion, disposing the entire main body portion and a part of the smaller diameter portion inside the tubular metallic member and allowing the a remaining part of the smaller diameter portion to protrude outward from a rear end of the tubular metallic member; and

a crimping step of crimping at least a portion of the tubular metallic member radially inward and thereby compressively deforming the elastic seal member.

2. A method of producing a gas sensor according to claim 1, wherein the elastic seal member protrudes outward from the rear end of the tubular metallic

member along the axial direction by 0.6 mm or more after the crimping step.

3. A method of producing a gas sensor according to claim 1 or 2, wherein the smaller diameter portion of the elastic seal member before compressive deformation has a nearly cylindrical section and a connecting section connecting between the cylindrical section and the main body portion and increasing gradually toward the main body portion.

4. A method of producing a gas sensor according to claim 1 or 2, wherein the outer circumferential surface of the smaller diameter portion of the elastic seal member before compressive deformation forms an inclined surface that tapers toward a rear end side.

5. A method of producing a gas sensor according to claim 3 or 4, wherein the relation of $0.7 \leqq d/D < 1.0$ is satisfied where D is the inner diameter (unit: mm) of the rear end of the tubular metallic member and d is the outer diameter (unit: mm) of the smaller diameter portion of the elastic seal member corresponding in position to the rear end of the tubular metallic member after the disposition step.

6. A method of producing a gas sensor having a sensor element extending in an axial direction and having a front end side to face a measured gas, a metallic housing radially surrounding the sensor element and holding the sensor element, a tubular metallic member

provided to a rear end side of the metallic housing, at least one lead wire extending from an inside to an outside of the tubular metallic member and having a conductor wire electrically connected to the sensor element and an insulating film covering the conductor wire, and an elastic seal member having a lead wire insertion hole into which the lead wire is inserted, characterized by comprising:

a disposition step of disposing the elastic seal member inside the tubular metallic member so that the a portion of the elastic seal member protrudes outward from a rear end of the tubular metallic member; and

a crimping step of crimping at least a portion of the tubular metallic member radially inward and thereby compressively deforming the elastic seal member;

wherein the crimping step is performed under a condition where a space between the rear end of the tubular metallic member and the outer circumferential surface of the elastic seal member corresponding in position to the rear end of the tubular metallic member is larger than a space between an inner circumferential surface of a portion to be crimped of the tubular metallic member and the outer circumferential surface of the elastic seal member corresponding in position to the portion to be crimped of the tubular metallic member.

7. A gas sensor comprising:

a sensor element extending in an axial direction and having a front end side to face a measured gas;

a metallic housing radially surrounding the sensor element and holding the sensor element;

a tubular metallic member provided to a rear end side of the metallic housing;

at least one lead wire extending from an inside to an outside of the tubular metallic member and having a conductor wire electrically connected to the sensor element and an insulating film covering the conductor wire; and

an elastic seal member having a lead wire insertion hole into which the lead wire is inserted, characterized in that a space is provided between the rear end of the tubular metallic member and the outer circumferential surface of the elastic seal member.

8. A gas sensor according to claim 7, wherein the elastic seal member includes a main body portion disposed inside the tubular metallic member and a smaller diameter portion disposed at the more rear end side than the main body portion and smaller in outer diameter than the main body portion, and the space is provided between the rear end of the tubular metallic member and the smaller diameter portion.

9. A gas sensor according to claim 7 or 8, wherein the tubular metallic member includes a fixing portion that fixes the elastic seal member to an inside thereof and a larger diameter portion disposed at the more rear end side than the fixing portion and larger in inner diameter than the fixing portion, and the space is formed between the larger diameter portion and the

elastic seal member.

10. A gas sensor according to any of claims 7 to 9, wherein the elastic seal member protrudes outward from the rear end of the tubular metallic member along the axial direction by 0.6 mm or more.